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DESCRIPTION OF A SIMPLE INSTRUMENT

FOR

INFLATING THE LUNGS OF INFANTS

BORN IN AN ASPHYXIATED STATE,

WITH REMARKS.

BY

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INFLATING THE LUNGS OF INFANTS

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In the more severe and desperate cases of congenital asphyxia, or, more correctly speaking, apnœa neonatorum, the majority of obstetric writers seem to consider inflation of the lungs the most successful and efficacious plan of treatment. Instances of suspended animation in the new-born child are met with of various shades and degrees of intensity; but it is principally to the well-marked and decided cases, and to insufflation of the lungs, that the following remarks are intended to refer:—

The usual methods by which artificial respiration is effected, consist in either applying the mouth directly to the child's mouth, or by means of an intervening flexible or metallic tracheal tube; or, lastly, the application of a pair of bellows contrived and constructed for the purpose. The former of these resuscitative methods, or inflation by mouth applied to mouth, although perhaps the readiest, becomes very fatiguing and exhausting when long continued—the more so from the constrained and irksome position the operator has frequently to assume and retain; and, besides, it is not always very pleasant or agreeable to apply one's mouth directly to that of a child born of a filthy or diseased mother. On one or two occasions when having recourse to this method of inflation, I found that little or no air entered the child's larynx, in consequence of a retracted condition of its tongue.

Another objection to this plan is, that the air forced into the child's lungs is very apt to be more or less impure, warm, and moist. Most of these objections apply to the simple laryngeal tube. The bellows is a clumsy, cumbrous, and unportable apparatus, and not likely to be at hand when required. Finding, therefore, that each and all of these restorative measures are more or less objectionable and unsatisfactory, I have been induced to construct the little instrument about to be described, which I have found serviceable on several occasions. I should add, that I have not as yet had an opportunity of using a Read's double-action syringe, which has been strongly recommended by the late Dr. Snow.

The instrument essentially consists of a vulcanized india-rubber ball about the size of an orange, to which is attached a German-silver tube, about six inches long, and gently curved towards its free extremity. The tube is closed at the extreme end, but has two openings or eyes, like a female catheter, a short distance from the point. On compressing the ball, the contained air rushes along the tube and through the openings above-mentioned, and on removing the pressure the ball rapidly expands, and becomes instantly refilled with air, which may again be evacuated as before. On introducing the tube into the larynx, and acting in this manner, it is obvious that for the most part the same air would be used over and over again, which would be a manifest disadvantage and a decided objection. This, however, may be easily remedied, by making another opening in the tube, about an inch from its attachment to the ball, for the free ingress of fresh, cool, dry air. During the compression of the ball, the left thumb will easily cover the opening, which must, however, be removed to admit the entrance of pure air during the subsequent expansion of the ball. This opening being somewhat larger than the other two, and being much nearer the ball, readily permits the entrance of fresh air. The instrument can be readily introduced in the following manner:—After throwing back the child's head a little, pass the left forefinger over upon the root of the tongue, into the rima glotidis, then with the instrument in the right hand, slide the tube along the surface of the finger (which at once depresses the tongue and serves as a guide), and on reaching the rima, insert the tube at the moment you withdraw the finger. If this plan of operating be attended to, there is little fear of introducing the tube into the pharynx instead of into the larynx. It is not so necessary, as when other methods of inflation are used, to push back or depress the larynx in order to prevent the transmission of the air through the œsophagus. The insufflation of the lungs must be gently and slowly performed, so as to simulate as nearly as possible the normal respiratory process. After each inflation, the chest must be slightly compressed, in order to facilitate the expulsion of air from the lungs. The inflation of the lungs, alternated with pressure on the chest, should be steadily persevered in until respiration is regularly established, and ought never to be relinquished as hopeless whilst the least fluttering or quivering motion over the cardiac region is perceptible.

This instrument is abundantly simple, both as regards principle and construction. It can be easily introduced, and worked for any period with little exertion; and, from its small size, is very portable. The air injected into the lungs is at once pure, cool, and dry, and the force with which it may be propelled, can be easily regulated. It is not so liable to rupture or injure the pulmonary air-cells, which there is reason to fear is sometimes done in consequence of too violent restorative attempts at insufflation with the mouth or with the bellows. The irritation which the presence of the tube may occasion in the fauces and larynx, instead of being detrimental to the child, as I have heard remarked, ought of itself in many cases to have a salutary and beneficial effect, as tending to excite a gasping inspiration or a convulsive sigh or sob. If the instrument is properly applied, as I have already remarked, the air is more certain to enter the lungs, and less likely to pass into the stomach and distend the intestines, as is too often the case when the mouth alone is used, even although the larynx be pressed back. Many infants, I am convinced, are lost from the process of respiration being impeded by the presence of fluid or mucus in the air-passages, and which, from inherent weakness and debility, they are unable to expel. This is indicated by a peculiar rattling or gurgling sound when the child attempts to breathe. This collection of mucus or fluid in the respiratory passages, is, I conceive most likely to occur when the child's head is the last part to be born, and particularly when retained in the vagina for some time. This may arise from two causes. The impression made on the cutaneous nerves of the chest by contact with the atmospheric air induces the child to inspire, and thus to draw in mucus or other fluid lying in the vagina in contact with the mouth. The entrance of any fluid into the larynx or trachea in such cases may be also occasioned by gravitation. Of course the fluid may enter the œsophagus, but this is of minor consequence. It appears to me that this cause of suspended or interrupted animation in the newly-born infant has been too much overlooked and neglected. With the instrument above described I have on several occasions succeeded in withdrawing considerable quantities of fluid from the air-passages, with the effect of materially relieving the breathing. When the fluid is in large quantity, the tube may become clogged up, and the ball partly filled, when it becomes necessary to withdraw the instrument, and clear it of all the fluid, otherwise it will be again injected into the air-passages. In the slighter forms of asphyxia the use of the instrument is quite unnecessary, and, when employed in the more urgent cases, it does not preclude or interfere with the use of other means, such as the alternate immersion in the hot and cold bath, affusion or aspersion with cold water, stimulants applied to the surface, or introduced per rectum, rubbing with warm flannel, galvanism or electricity if a proper apparatus is at hand, &c.

The instrument may be obtained from Mr. W. B. Hilliard, surgical instrument maker, Renfield Street.

In those cases of suspended animation, with lividity of the child's countenance, and other symptoms indicative of cerebral congestion approaching the apoplectic condition, the respiration will frequently be much facilitated by relieving the engorged and overloaded vessels of the brain, and this may generally be done by allowing a drachm or two of blood to escape from the divided vessels of the cord before applying the ligature. When much difficulty is experienced in the birth of the child's head after the delivery of its body, the salvation of the infant may, I am convinced, in many cases be secured by establishing intra-vaginal respiration. There can be no doubt but that, in the absence of the forceps in such cases, a degree of traction on the neck of the child is sometimes exerted before the head is delivered which is of itself almost incompatible with life. Indeed, in two or three cases which have lately come under my own observation, the child, although so far resuscitated as to respire by its own efforts for several hours, yet the injury done to the cervical region was such as to preclude all chance of its ultimate survival. The application of the forceps in such cases does away with the necessity of dragging or pulling much upon the neck; but these instruments are unfortunately often not at hand when required, and some time must necessarily elapse before they can be procured, thus occasioning a delay which will in all likelihood be fatal to the child if let alone. As soon then as it is ascertained during the course of labour that the head of the child will be the last part of it born—especially if any difficulty or delay is anticipated in its transit—the forceps should be sent for, and kept in readiness in the event of their being required. When the head is firmly retained after the birth of the body, and the forceps are not at hand, endeavour, if possible, to excite and maintain the respiratory process till they be procured. This may sometimes be accomplished by merely keeping the child's mouth open with the finger, and the perinœum retracted, so as to permit the free access of air into the vagina, or the instrument above described—either as it is, or with an elastic catheter, or a flexible tube substituted for the metallic one—may perhaps be employed with greater prospect of success.

The infant at birth clings with such tenacity to life, that—in the absence of putrefaction, or any malformation, defect, &c., incompatible with life—it becomes often a very difficult matter to determine with any degree of certainty whether the vital principle is actually extinct, or animation merely suspended. We should, at all events, never too hastily despair of effecting the complete restoration of the infant, however unpromising the case may at first sight appear. There is good reason for believing that many infants, especially amongst the lower classes, are annually consigned to the tomb, whose lives might have been preserved had resuscitative means been fully and fairly tried.

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